EUFOFINET (European Forest Fire Network)

North Aegean Region: Cartography action plan (GP4)

This document constitutes the action plan of the North Aegean Region concerning the good practice provided by partners of the EUFOFINET project on the key theme of Cartography – mapping as a tool for forest fire risk prevention and management (GP4).

1) The EUFOFINET Project context

The "European Forest Fire Networks" Project (EUFOFINET) is an INTERREG IVC Capitalization Project which is co-financed through the European Regional Development Fund (ERDF). INTERREG IVC brings Regions of Europe to work together and to share experience and "**good practice"** in the areas of innovation, the knowledge economy, and the environment and risk prevention.
A Capitalization Project is an interregional cooperation project which focuses on the transfer of good practices in a specific objective (such as a methodologies, processes, techniques), which were previously developed, identified and successfully tested by the partners and which have the potential to be transferred to another geographic area.
One of the innovative character of this kind of project and of its results is the fact some of the identified good practices, which were developed and worked among different regions and different countries with the contribution of many stakeholders will be transferred through "an action plan" as a suitable policy or strategy related with the management of forest fire risk to the other partners.

The EUFOFINET project focuses on good practice in wildfire prevention, suppression and intervention.
It has focused on five key themes related to wildfires & forest fires:

- detection and prevention of wildfires;
- wildfire suppression strategies;
- mapping risks and hazards;
- training and simulation strategies
- restoration of land burned by wildfire.

The project duration is 26 months starting from October 2010 until December 2012. The total project budget is 2.084.093 EUR and the fund allocated is 1.655.521 EUR (79%).

The project involves 13 partners from height European countries:
Four Greek partners, who represent regions where wildfires are a major problem, are participating to the project:

- The Regional Union of Attica Municipalities, PEDA, (project leader),
- The North Aegean Region

- The Epirus Region
- The Thessaly Region

The other partners involved are:

- The National Forests Office (Mediterranean Territory) (France).
- The Mediterranean Forest Alliance (France).
- The Tuscany region (Italy)
- The National Forests Centre (Slovakia)
- The Centre for servicing woods and forests of Castilla y Léon (Spain)
- The Galician Academy of Public Security (Spain)
- The Frederikssund-Halsnaes Fire and Rescue Service (Denmark)
- The Forest Research Institute (Poland)
- The Northumberland Fire and Rescue Service (England)

The aim of the project is to facilitate the cooperation among national, regional and local authorities and actors from different countries of the EU through the transfer of their experiences and through the development of action plans in order to improve the efficiency of the policies of regional development.
Some of the duties related to the project are the dissemination and transfer of the results and good practices developed and implemented in the frame of the previous project, integrating them into the regional policies and showing them to other European regions that try to improve their policies.

2) The North Aegean Region involvement to the project EUFOFINET

2.1 Elements for the North Aegean Region

The North Aegean Region is one of the thirteen regions of Greece. It includes the northeastern part of Greece, which is also the southeastern border of European Union. It comprises the islands of the north-eastern Aegean Sea, except for Samothrace, which belongs to the Region of East Macedonia and Thrace, and Imbros and Tenedos which belong to Turkey.
Administratively, the North Aegean region was established in the 1987 administrative reform. With the 2010 Kallikratis plan, its authority was redefined and extended. The capital of the region is situated in Mytilini in the island of Lesbos. Until the reform, the region consisted of the three prefectures of Samos, Chios and Lesbos. Since 2011 it is divided into five regional units, formed around major islands: Chios, Ikaria, Lemnos, Lesbos and Samos. The other populated islands are: Agios Efstratios, Inousses, Psara and Fournous.
The total surface of the Region is about 3.836 sq. km and total population of 204.108 citizens (2001 census).
The forested areas are mainly located on the largest inhabited islands of Lesbos, Samos, Chios, and Ikaria, which are the more populated areas. The fact that anthropogenic activities are concentrated in the more vegetated islands increases the risk and hazard of wildfires in the North Aegean Region. Moreover, the complex and sharp relief, the mosaic of ecosystems and habitats combining with the human infrastructures are the main key elements to have to taking into account to support forest fire prevention and management as well as post-fire restoration.

2.2 Implementation of the North Aegean Region to the EUFOFINET project

In the frame of the EUFOFINET project the North Aegean Region has share with the other partners of the project its acquired experience in specific fields as good practices and vice-versa has adopted good practices from other partners, which are considering that they could bring an add-value to practices applied in the region in the prevention, restoration, fighting and management of forest fires.

Another important issue for the North Aegean Region as the official managing authority involved in the EUFOFINET Project is to take care to transfer the knowledge obtained from the project to all the services and organizations involved in the forest fire prevention and fighting: Fire Brigade, Forest Services, Municipalities, Army and Volunteers (and scientific institutions).

The **main objectives** of the participation of the North Aegean Region to the project are:

- Facilitate the transfer of relevant good practice able to improve regional and national policies efficiency for forest fire risk prevention and management.
- Disseminate to other partners the relevant know-how of the Region acquired in previous projects, such as the OCR-INCENDI cartography – mapping of forest aiming to support forest fire prevention and management so well as post-fire restoration for the islands of Lesbos, Chios, Samos and Ikaria, and the traditional practice of resin collection - cultivation, as activity reducing fire risk.
- Identify and promote common intervention procedures in order to define a flexible model(s) that could be utilized by any entity with an interest in forest and wild fire prevention and management.
- Establish an international network of institutional contacts and operational links in the fields of wildfire prevention and wildfire suppression.
- Attempt to harmonize common frames of reference in the EU with regards to wildfire prevention and wildfire suppression.

2.3 Synergy with the regional operational programmes

The EUFOFINET project is closely related with many other projects that the North Aegean Region is involved:

- FOR CLIMADAPT: a European project that aims at encouraging initiatives and innovative experiments for an adapted management of the Mediterranean wooded ecosystems to the current and upcoming impacts of climate evolutions. As a result of climate change and other factors, forests are facing increased risk of fire, soil erosion, landslides, etc.
- ICHNOS PLUS (IVC): focus on the transfer and deployment of a model of Regional Centre of Competence for One-Stop Shops and its mainstreaming into the regional polices through the ERDF Operational Programme.
- BIOBUS: to strengthen the awareness of the regional community on the use of biodiversity and innovation and of the benefits developing North Aegean to a competent, dynamic knowledge based region.
- EX-INT: collection - documentation of the experience which has been accumulated from the INTERREG projects starting 1990 till today.
- MOONRISES (ARCHIMED): management, forestalling and attenuation of natural risks.
- WESTMUST: concerns the complete and viable management and protection of the cultural, natural sources and landscapes.

- CORI: identification and mapping of tsunami and other extreme sea level hazards for Eastern Mediterranean coasts.
- PACINTERREG (INTERACT): creation of a data base that includes all IIIC.

3) EUFOFINET Good Practices

3.1 Presentation

The five good practices had been chosen by the partnership for the relevance that these good practices have on the development and management of suitable policies and strategies on prevention and fight of forest fires.
In the EUFOFINET project, six technical workshops and seminars concerning each one a specific good practice (GP) were held. During the procedure, each partner, called **"donor partner"**, presented a description of its relevant experience and disseminated it by delivering specific documents.
The North Aegean Region, as already mentioned above, presented also its own experience in the good practices "Cartography" (GP4) and "Prevention" (GP3.2). Moreover, its external experts in forest fires, senior scientist researchers of the Forest Research Institute of Thessaloniki, presented an experiment in the frame of "Detection" (GP3.1)


The aim of these presentations is to bring the context and enough technical details, so well as financial information, to allow interested partners, called **"receiving partners"**, to integrate the entire or parts of this good practice in their own region via an action plan. A specific procedure allows an exchange of information between donors and receiving partners in order to clarify the possibility of the transferability of the good practice.

3.2 Selection of good practices

The North Aegean Region decided the most appropriate good practices suitable for implementation and to be transferred as receiving partners are:

- Intervention – Strategies (GP1)
- Detection (GP3.1) and prevention (GP3.2)
- Cartography (GP4)
- Restoration of burned areas (GP5)

The present document **"action plan"** is dealing with the **good practice of cartography (GP4)**. It has been produced for the North Aegean Region entity by its external experts. The main concern of the action plan is to integrate the good practices of EUFOFINET project partners in the specific conditions of the region. The action plans concerning GP1, GP3 and GP5 are presented in other documents.

3.3 Description of the selected good practice "cartography (GP4)"

All the partners presented have a similar approach of the cartography-mapping of forested areas. However, some of them, focused on specific layers, such as the amount of fuel or the infrastructures.
The cartography - mapping of forests is a very demanding sector, both in terms of information volume and type of analysis and treatments, which should be supported to improve its effectiveness.

Data have to be organized in two levels: the plant community level and regional and landscape. First, at the plant community level of an entire ecosystem who has to be presented as a multi-dimensional organization (both layers of trees and shrubs, parameters such as height, diameter of truck and foliage). Secondly, at a regional – landscape level that has to present the mosaic of types of ecosystems and parameters such as cover, fuel amount, infrastructures, etc.

Cartography of large areas has additional difficulties treating a large amount of data and effective spatial analysis of information.
The maps produced and the data integrated in the platform of GIS are presenting in a friendly environment, that gives the opportunity both to scientists and technicians foresters, or to whom it is concerns, and serve a range of management forest functions.
Special routines that are focusing on fire protection needs serving, both the prevention and fighting of forest fires, so well as the restoration of burnt areas.

For the coordinator of the fire fighting, there is a possibility of an immediate update of the information related to, for example, the location of the fire event, the more convenient accessibility to it, the availability of terrestrial or aerial means and forces, the fighting resource availability (mobile or built water tanks) and for infrastructure and facilities at risk who need protection.

A special software (as "Behave" or "Farsite") is allowing the prediction of the front of forest fires according the climatic parameters and the fuel type and amount of the vegetal formations in the fire event has been adapted and integrated.
This is a very strong and useful decisions tool, in the hand of the coordinator, in order to carry out, forecasting and scenario planning interventions. For example, a map presents a scenario of expansion of the forest fronts according to the humidity level. Another presents a scenario of the height of flames of fires according to the humidity level. Or even scenario for the fire heat energy.

The restoration of burnt areas, is facilitated, by the production and printing of thematic maps, of the burnt areas. In addition, a special report is produced, and printed which declares, according the Greek law, the burnt area as reforestation area and the record of the fire event. Moreover, it can include information on the specific conditions of the burnt areas and the

level and type of damages of the vegetal formations and the more appropriate species for reforestation.

The use of the GIS platform allows the reduction of the time to take decisions and reduce drastically the first intervention. There is a better prompt protection of the citizens by determining the areas that need priority protection. There is a better coordination of all forces of prevention and suppression. Eventually, there is a more efficient planning for post-fire management.

The immediate availability of the necessary information increases the effectiveness of the suppression of forest fires, as it will reduce the timing of decisions and suppression planning, so well as the transmission of directions to the fighting personnel.

Comparing with the international practice, but also the meeting in Leon, it appears the use of GIS in the prevention and suppression of forest fires is the most useful and efficient tool for fire coordinators and managers.

4) Action plan framework - Implementation of the GP4 in the North Aegean Region

4.1 Description and analysis of the problem in the region

Prevention, fighting and management of forest fires are, perhaps, the most important issue, in contemporary forestry. The problem of forest fires is, of particular importance for Greece, due primarily, to a significant shift, in the socioeconomic conditions over the last decades. Increased fuel loads, as a result of urbanisation and forest abandonment, and increased number of forest visitors, led to an increase number of forest incidents, as well as increased fire intensity and burned area.
In Greece there are a relatively low number of fire events, but the proportion of burnt area to fire event number, per year, is the worse in Europe. This means that despite the great efforts being made, at central and regional level, there is a significant lack of efficiency in dealing with forest fires.

There is a major problem of coordination of all involved forces in the prevention and fighting of forest fires. The main cause of this situation is the available information has a lack of relevance to the needs of prevention and fighting of fires. For example, the data the local forestry department has for the type of fuel in each forest stand, may be completely different from the data available to the Fire Brigade. The same happens with the approach roads and tracks for each area, natural and artificial water reservoirs, fire zones etc.

The region of North Aegean is by its topography and location a sensitive area in Greece. There is also a geographical isolation of the islands from the mainland and by consequence from a direct terrestrial intervention. Moreover, the vegetal formations, characterized by extreme high flammability, growing in these more arid Mediterranean climatic environments, are often subject of huge fire events. Major natural forests and mastic tree plantations of Chios Island were burned this summer. In previous years extended areas were burned in Samos and Ikaria.

Frequent fires, already have reduced a part of the vitality of forests, and their potentiality of recovery, and many of them have been degraded, in lower vegetal shrub formations, as phrygana. The forest cover of the large islands of Northern Aegean (with the main forest vegetation) is reduced because of the frequent fires. Moreover, other forested areas, which are still characterized as forests, are now degraded because of their fragmentation due to openings for roads or by overgrazing, illegal constructions, etc.

The problem of early intervention is due to the lack of direct information about the local conditions of the terrain or even the entire region that begins a fire in order to reduce the time of first intervention.

The levels of information needed for an integrated prevention and intervention information of forest fires are: relief, topography, land use, fuel biomass, roads and tracks, water points, infrastructures and priority areas to protect.

4.2 Objective of the transfer of the GP3.1 and GP3.2

The North Aegean Region authority by adapting the good practice emerged from the EUFOFINET project on the cartography has as main objective the production of maps aiming to support forest fire prevention and management as well as post fire restoration for the islands of Lesbos, Chios, Samos and Ikaria.

4.3 Strategy of implementation of the action plan

The North Aegean Region will apply the main elements of the good practices presented for the production of maps for forest fire risk prevention, restoration and management for the four main islands.

The material has to be structured in thematic multilayer maps and interactive maps.
The maps produced and the data integrated in the platform of GIS have to be presented in a friendly environment, in order to give the opportunity both to fire fighters, volunteers, scientists and technicians foresters, or to whom it is concerns, to serve a range of management forest functions.

4.4 Specific legal – regulatory framework

In Greece, until 1997 the Forest Service had the entire responsibility for the protection of forests from fires. Since 1998, the Fire Brigade is in charge for the suppression of the fires in forest and vegetated areas in general (Law 2612/1998), with the assistance of the General Secretariat for Civil Protection. The jurisdiction of the prevention of forest fires is still remaining in the hands of the Forest Service.
But, some key elements of prevention, such as editing relevant fire regulations and rules, information and awareness on forest fire of the citizens, organization of patrols, the surveillance of the forest with terrestrial and aerial means, the distribution of fire fighting forces, the cooperation with other authorities and organizations, the post fire surveillance of burned areas for potential new fires, are now under the responsibility of the Fire Brigade.

Municipalities are also involved in the prevention of forest fires by undertaking the design and execution of "forest works" (e.g. cleaning of forest vegetation) in public forests and wooded lands in their area of authority after consultation with the Ministry of Agriculture.
Eventually, the Army, the Police and Organizations of Volunteers, which are operating under several laws and presidential decrees (1951/1991, P.D. 32/1992, 8281/1995), are also involved in the prevention and suppression of forest fires.
Although there is a relative relationship and a mutual understanding and cooperation of all services involved, there is a major problem of coordination, mainly due to the fragmentation and overlapping of responsibilities and their different structure and philosophy. More important, they are using different information sources and platforms.

4.5 Actions and schedule of implementation

In order to apply the strategy adopted for the action plan of cartography, it appears there is a necessity, to update the existent cartographical material and improve it with new elements for the main islands of the region (Lesbos, Chios, Ikaria, and Samos).

Data have to be organized in two levels: the plant community level and regional and landscape. First, at the plant community level of an entire ecosystem who has to be presented as a multi-dimensional organization (both layers of trees and shrubs, parameters such as height, diameter of truck and foliage). Secondly, at a regional – landscape level that has to present the mosaic of types of ecosystems and parameters such as cover, fuel amount, infrastructures, etc.

The material has to be structured in thematic multilayer maps and interactive maps. Moreover, sspecial routines have to focus, on fire protection needs serving, both the prevention and fighting of forest fires, so well as the restoration of burnt areas.
A special manual configuration will allow to record in the system coordinates, signals and information received through remote sensing means such as airplanes, cameras, observers.
The levels of information needed for an integrated prevention and intervention information of forest fires are:

- Topographical maps
- Fuel type and amount
- Safe, fast and alternative roads and tracks approach
- Technical and natural water points
- Infrastructures
- Priority areas to protect (fuel tanks, children camps, churches, monasteries etc).
- Integration of models predicting the front of forest fires.

Actions adopted:

1. Production of the maps and the thematic layers.
2. Training sessions.
3. Seminars.

Completion period: nine months, six (6) months for the update and production of the maps and thematic layers (action 1), two (2) months for training the staff of public services involved in the prevention, restoration and fighting forest fires, and one (1) month for the organization of dissemination seminars to target groups of citizens.

4.6 Operational implementation

The aim of the North Aegean Region, in this action plan, is to produce useful scientific material that will be support the Services and groups of citizens involved in the forest fires prevention and fighting.
The second important goal is to coordinate these public services as typical head administrative authority.
In order to increase the succeed of the action is to bring together around a table all the services and organizations involved in the forest fire prevention and fighting: Fire Brigade, Forest Services, Municipalities, Army and Volunteers (and scientific institutions).
Finally, the North Aegean Region will use its experience and competence in dissemination actions organizing seminars for targets groups of citizens.

The North Aegean Region will supervise the action 1, which will be produce by external experts and organize the dissemination actions 2 and 3 of training and seminars.

4.7 Evaluation indicators of the action plan

Time schedule

Action 1. Production of maps and thematic layers: months 1 to 6, for the completion of the action.
Action 2. Training sessions: four sessions, one for each island, months 7 to 8.
Action 3. Seminars: total of four (4), again one for each island, duration month 9, at the end of the above activities.

External expenditure

Action 1. Production of maps and thematic layers: 30.000 € (cost of expertise).
Action 2. Training sessions: 12.000 € (3.000 € / island, cost of expertise and travel and subsistence).
Action 3. Seminars: 12.000 € (3.000 € / island, cost of expertise and travel and subsistence).

Action plan funding

As an entity or in parts: public funds, European funds, sponsoring, integration in new projects, self-financed by the North Aegean Region or a combination of the previous.

Deliverables

Action 1. Database with thematic layers: date of delivery month six (6).
Action 2. Training sessions, number, four (4).
Action 3. Seminars: number, four (4).

5) Conclusion

The aim of the project EUFOFINET is to allow to “donor partners” to share their experience - “good practice” in wildfire prevention, restoration and fighting through the development of

action plans to “receiving partners” in order to improve the efficiency of the policies of regional development.

The North Aegean Region has it-self transferred its relevant know-how acquired in previous projects in cartography of forest aiming to support forest fire prevention and management for the main islands, and the traditional practice of resin collection - cultivation, as activity reducing fire risk. Moreover, its external experts in forest fires presented a detection experiment.

The North Aegean Region is facing to a major problem in fighting strategies, prevention of forest fires and restoration of burned areas, because of objective facts of topography, such as isolation from the mainland, extreme high flammability of the vegetation, increase number of wild-fires, but also due to the lack of coordination of the services involved and the absence of official planning regulating pre-fire and post-fire interventions and management practices of forest and burned areas.

In order to take profit of the knowledge of the partners of the consortium, the North Aegean Region decides to be a “recipient donor” for the good practice “cartography” and to apply a strategy how to implement it through an action plan, adapted to the four main islands (Chios, Lesbos, Ikaria, and Samos), which comprises an update of the existent cartography and mapping, and improve it with new elements to support forest fire prevention and management as well as post fire restoration for each island separately, and organizing training sessions of the staff of the services and organizations involved in the forest fire prevention, restoration and fighting and dissemination seminars for target groups of citizens.

The North Aegean Region with its participation to the EUFOFINET project has been in contact with good practices and innovative techniques in the area of the prevention, restoration and fighting of forest fires.
However, most of all, the participants of the North Aegean Region to the project, had the opportunity to exchange constructive scientific views, but also to develop a frame of warm personal contacts with the other partners.

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